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Final Report

Adit & Shaft Project, Phase 13
Broadwater County, Montana
Radersburg Area Sites
IFB 4818-G

January, 1987

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CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDAVE



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Final Report

Adit & Shaft Project, Phase 13
Broadwater County, Montana
Radersburg Area Sites
IFB 4818-G

January, 1987

Prepared for: Richard Juntunen, Chief
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I. Introduction

A. Project Objectives

The Phase 13 Adit and Shaft Project was undertaken to eliminate the public safety hazards resulting from unreclaimed mine openings at several abandoned hardrock mines in Broadwater County, Montana. Closure of dangerous shafts and adits through backfilling, bulkhead installation, and/or fencing was accomplished to eliminate accidental entry.

B. Project Location

The project covered twenty sites located near Radersburg, Montana. Legal descriptions are listed below and site locations are shown on the vicinity map contained herein.

Radersburg Mining District

Black Friday Site	T5N R1W Sec. 24 NW
Bluebird Site	T5N R1W Sec. 23 NE
Copper King / Queen Site	T5N R1W Sec. 9 NE
Eldorado Site	T5N R1W Sec. 13 NE
Gold Brick Site	T5N R1W Sec. 13 NE
Gold Dust Site	T5N R1W Sec. 13 NE
Gopher Site	T5N R1W Sec. 24 NW
Greenhorn Site	T5N R1W Sec. 12 SE
Iron Age Site	T5N R1W Sec. 24 NW
Jo Dandy Site	T5N R1W Sec. 28 SE
Johnny Gulch Site	T5N R1W Sec. 23 SE
Kahoka Site	T5N R1W Sec. 15 NE
Keating Site	T5N R1W Sec. 14 E & T5N R1E Sec. 18 W
Lucky Friday Site	T5N R1W Sec. 12 SW
Mabel Site	T5N R1W Sec. 12 SE
Nada Site	T4N R1W Sec. 4 NW
North Home Site	T5N R1W Sec. 16 S
Ohio Site	T5N R1W Sec. 13 SE
Rena Site	T5N R1E Sec. 7 SW
Ruby Site	T5N R1W Sec. 33 NW
Summit Site	T4N R1W Sec. 17 SE
Surprise / Powerline Site	T5N R1E Sec. 7 SW
Tidal Wave Site	T5N R1W Sec. 13 NE
Vermont Quarry Site	T5N R1E Sec. 4 NE

C. History

Hardrock mining has taken place in Montana since 1862 and was essentially unregulated from a reclamation standpoint for over one hundred years. This resulted in thousands of hazardous shafts and adits in mining districts across the state.

A brief history of the Radersburg Mining District follows:

Pay gravel found near the present site of Radersburg led to the discovery of the Keating vein in 1866. In 1870, construction of a 15 stamp mill enabled the property to operate continuously until 1877, when the known ores were exhausted. Activity revived with the completion of the Northern Pacific Railway and the installation of smelting facilities at Butte & Helena. Almost continuous production was maintained at the Keating mine up to 1948 when mounting costs shut it down.

Coincident with the development of the Keating Mine, a number of other lodes were exploited. A substantial output was obtained from the Black Friday, Ohio, and North Home properties. Since 1949 little mining has taken place at Radersburg with the exception of small scale high grading operations and prospecting ventures.

D. Site Description And Problems

The sites included in this project are located near a residential area, historic sites, close to public roads or in recreation areas. All mine openings threatened public safety. The shafts involved were of depth great enough to prevent unaided escape upon entry. Adits were reclaimed or bulkheaded to protect the curious from unsuspected dangers.

II. Description of Project Reclamation

A. Project Planning

Backfill was recommended for all mine openings to permanently eliminate the hazards. Many landowners refused to allow this, insisting instead on accessing bulkheads or fencing. These techniques do accomplish the goals of preventing accidental entry but are semi-permanent in nature and may require maintenance in the future.

B. Chronological History

Pre-Bid Conference	April 23, 1985
Bid Opening	May 7, 1985
Contract Award	May 9, 1985
Contract Awarded To:	

Swan & Sons Construction, Inc.
Route 1, Box 11
Anaconda, MT 59711
(406)797-3213

Pre-Construction Meeting	June 6, 1985
Notice to Proceed	June 13, 1985
Began Work	June 10, 1985
Substantially Complete	July 9, 1985
Resumed Work	April 7, 1986
Project Completed	April 11, 1986

C. Equipment

J.D. Tractor with Auger and Post Driver
Air Compressor with Air Drill
Dynamite for Blasting Post Holes
I.H. D-15 Dozer
CAT D 7G Dozer
J.D. 664C Loader
Hydroseeder (2500 gal. cap.)

D. Construction Operations

The Contractor performed the following:

1. Backfilled 1 adit
2. Backfilled 21 shafts
3. Backfilled 2 pits
4. Installed 3 - 6'x 6' adit doors
5. Installed 8 wood shaft covers (4'x 6', 6'x 10', 6'x 10', 15'x 15', 6'x 3', 3'x 3', 5'x 5', 4'x 8')
6. Installed combination barbed and woven wire fence at 13 sites
7. Revegetated all areas disturbed by construction activities

III. Cost Summary

A. Final Payment Request

A copy of the Final Payment Request is contained in Appendix A. That document contains the final quantities and costs for each work item.

B. Change Order

The following Change Order was executed during the course of the project:

1. Change Order #1 - Additional mobilization to Vermont Quarry Site, S.H.P.O. delayed approval. Contractor returned after substantial completion to perform work.

C. Cost Per Site / Unit

The following summary describes the work performed at each site. Unit costs for the various work items are shown in the Final Payment Request contained in Appendix A.

- | | |
|--|-------------|
| 1. Black Friday Site | \$ 4,688.00 |
| a. Backfill 2 shafts & 1 pit (182 c.y.) | |
| b. Install wire fence (76.9 rods) | |
| c. Install hazard signs (28 each) | |
| d. Seed, fertilize & mulch | |
| 2. Bluebird - Gopher Site | \$ 336.00 |
| a. Backfill 10 shafts (309 c.y.) | |
| b. Seed, fertilize & mulch | |
| 3. Copper King / Queen Site | \$ 2,294.00 |
| a. Install wire fence (37.3 rods) | |
| b. Install hazard signs (16 each) | |
| c. Seed, fertilize & mulch | |
| 4. Eldorado - Gold Brick - Lucky Friday Site | \$ 684.00 |
| a. Backfill 2 shafts (90 c.y.) | |
| b. Install wire fence (9.3 rods) | |
| c. Install hazard signs (4 each) | |
| d. Seed, fertilize & mulch | |

5. Gold Dust Site \$ 2,294.00
 - a. Install wire fence (9.3 rods)
 - b. Install hazard signs (4 each)
 - c. Install 2 wood shaft covers (4'x 6', 6'x 10')
 - d. Seed, fertilize & mulch
6. Greenhorn Site \$ 1,160.00
 - a. Install wire fence (18.6 rods)
 - b. Install hazard signs (8 each)
 - c. Seed, fertilize & mulch
7. Iron Age Site \$ 754.00
 - a. Install wire fence (16.3 rods)
 - b. Install hazard signs (4 each)
 - c. Seed, fertilize & mulch
8. Jo Dandy Site \$ 4,123.00
 - a. Backfill 1 adit (9 c.y.)
 - b. Install adit door (6'x 6')
 - c. Install wire fence (37.3 rods)
 - d. Install hazard signs (16 each)
 - e. Seed, fertilize & mulch
9. Johnny Gulch Site \$ 594.00
 - a. Install wire fence (9.3 rods)
 - b. Install hazard signs (4 each)
 - c. Seed, fertilize & mulch
- ** 10. Kahoka Site
 - a. Backfill 2 shafts (55 c.y.)
 - b. Seed, fertilize & mulch
11. Keating Site \$ 6,175.00
 - a. Install wire fence (101.4 rods)
 - b. Install hazard signs (36 each)
 - c. Install wood shaft cover (6'x 10')
 - d. Seed, fertilize & mulch
12. Mabel Site \$ 594.00
 - a. Install wire fence (9.3 rods)
 - b. Install hazard signs (4 each)
 - c. Seed, fertilize & mulch
13. Nada - Ruby Site \$ 2,578.00
 - a. Install 3 wood shaft covers (15'x 15', 6'x 3', 3'x 3')
 - b. Seed, fertilize & mulch

14.	North Home Site	\$ 2,010.00
	a. Install wire fence (18.6 rods)	
	b. Install hazard signs (8 each)	
	c. Install wood shaft cover (5'x 5')	
	d. Seed, fertilize & mulch	
** 15.	Ohio Site	
	a. Install wood shaft cover (4'x 8')	
	b. Seed, fertilize & mulch	
16.	Rena Site	\$ 1,408.00
	a. Backfill 3 shafts (1381 c.y.)	
	b. Seed, fertilize & mulch	
17.	Summit Site	\$ 5,611.00
	a. Install wire fence (18.7 rods)	
	b. Install hazard signs (8 each)	
	c. Install wood shaft cover (4'x 8')	
	d. Install 2 adit doors	
	e. Seed, fertilize & mulch	
18.	Surprise & Powerline Sites	\$ 59.00
	a. Backfill 2 shafts (31 c.y.)	
	b. Seed, fertilize & mulch	
19.	Tidal Wave Site	\$ 594.00
	a. Install wire fence (9.3 rods)	
	b. Install hazard signs (4 each)	
	c. Seed, fertilize & mulch	
20.	Vermont Quarry Site	\$ 5,241.00
	a. Backfill 1 pit (3000 c.y.)	
	b. Seed, fertilize & mulch	

	Total Project Cost	\$ 41,197.00

** These sites were dropped from the project after the Contract was awarded

IV. Summary

A. Completed Reclamation

The required work was completed within the Contract time allowed.

The project resulted in the complete plugging of some adits and shafts and limits access to other adits and shafts by installed doors, covers and fences. Hazard signs were installed where appropriate. Revegetation of disturbed areas was accomplished.

B. Comments

The Kahoka site was dropped from the Contract due to the fact the adjacent mine dumps, designated as fill to accomplish reclamation, were hauled off from the site for unknown reasons.

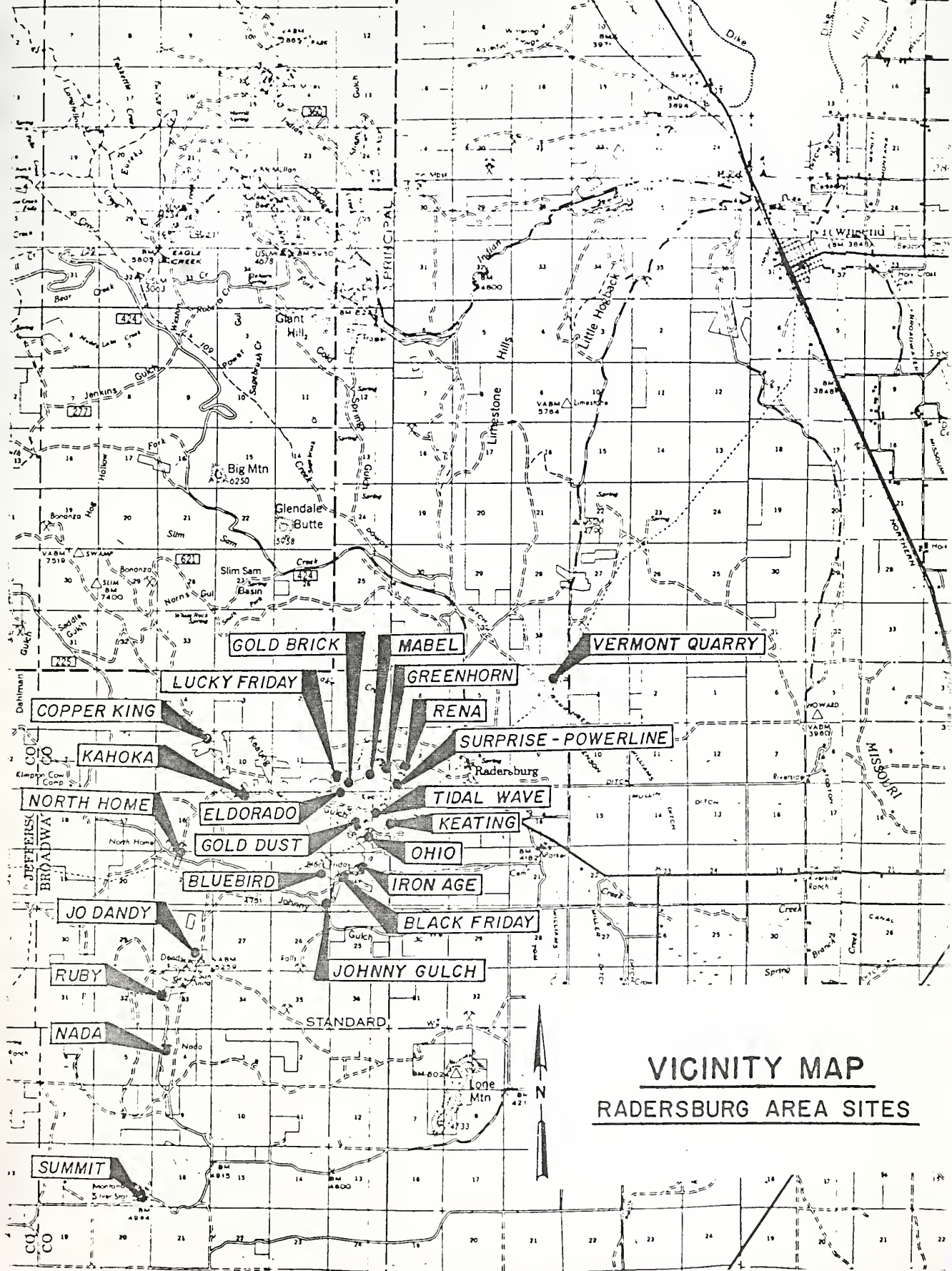
Construction of a wood shaft cover at the Ohio site was dropped from the Contract after lightening struck the headframe causing the structure to burn down. This destroyed the shaft collar and caused the shaft to cave in at the surface.

The Contractor completed the work as specified.

Monitoring of all sites should be undertaken periodically to insure all backfilling and fencing work and revegetation efforts remain intact.

V. Slides

The slide log and slides are contained in Appendix B.



APPENDIX A

FROM April 7, 1986

TO

April 12, 1986PROJECT NAME ADIT AND SHAFT PROJECT, PHASE 13 - BROADWATER COUNTY, MONTANALOCATION RADERSBURG AREAPROJ. NO. IFB 4818-GNAME OF CONTRACTOR SWAN AND SONS CONST., INC. ADDRESS RTE 1 BOX 111, ANACONDA, MT 59711

CHANGE ORDERS			CONTRACT STATUS			
No.	Description	Amount	Total Amount	Completed Amount	Uncompleted Amount	Per Cent Complete
1	Vermont Quarry Mobilization	2,264.40	39,000.00	38,982.20	-0-	100
Total Change Orders			2,264.40	2,214.40	-0-	100
CONTRACT TO DATE INCLUDING CHANGE ORDERS			41,264.40	41,196.60	-0-	100

TOTAL RETAINAGE \$ _____ COMPLETED TO DATE \$ 41,196.60SECURITIES ON DEPOSIT \$ _____ PLUS MATERIALS ON SITE \$ -0-ADJUSTED RETAINAGE \$ _____ TOTAL COMPLETED TO DATE \$ 41,196.60

*For use only when securities are on deposit in lieu of 10% retainage.

*10% OR ADJUSTED RETAINAGE \$ -0-TOTAL AMOUNT EARNED TO DATE \$ 41,196.60LESS PREVIOUS PAYMENTS \$ 35,516.01AMOUNT DUE THIS PAYMENT \$ 5,680.59LESS 1% TAX \$ 56.81TOTAL DUE CONTRACT \$ 5,623.78

I certify that this claim is correct and just in all respects and that payment or credit has not been received.

Approved By:

SWAN AND SONS CONSTRUCTION, INC.
(Contractor)MONTANA DEPT. OF STATE LANDS
OwnerBy John L. SwanDate 4/21/86RECOMMENDED BY:
L. C. HANSON COMPANY
(Engineer)By Walter J. BenjaminDate 4/22/86Richard J. [Signature]
4/25/86

ADIT & SHAFT PROJECT
 PHASE 13 - RADERSBURG

ITEMIZATION OF QUANTITIES AND COSTS

ITEM	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT PRICE BID	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	PERCENT COMPLETE
1.	BACKFILL MINE OPENINGS	LUMP SUM	5,000.00	LUMP SUM	5,000.00	100
2.	FENCE - TYPE CW OR CM	319 RODS	20.00	371.61	7,432.20	100
3.	PANEL - SINGLE TYPE CW	2 EACH	60.00	-0-	-0-	100
4.	PANEL - DOUBLE TYPE CW	144 EACH	70.00	145	10,150.00	100
5.	GATE - METAL 4' HEIGHT	10 LIN FT	18.00	-0-	-0-	100
6.	DEADMAN	9 EACH	10.00	10	100.00	100
7.	INSTALL STATE-FURNISHED SIGNS	144 EACH	25.00	144	3,600.00	100
8.	ADIT DOOR - TYPE "A" GRID	3 EACH	1,800.00	3	5,400.00	100
9.	WOOD SHAFT COVER	9 EACH	850.00	8	6,800.00	100
10.	SEEDING, FERTILIZING, MULCHING	LUMP SUM	500.00	LUMP SUM	500.00	100
	Sub-Total				\$38,982.20	
	<u>CHANGE ORDER NO. 1</u>					
1.	MOBILIZATION - Vermont Quarry	LUMP SUM	2,214.40	LUMP SUM	2,214.40	100
2.	SALVAGE COUPLING	LUMP SUM	50.00	-0-	-0-	100
	Sub-Total				2,214.40	
	TOTAL				<u>\$41,196.60</u>	

APPENDIX B

Phase 13 Adit & Shaft Project
Radersburg Mining District, Broadwater County
Slide Log

1.	June, 1984	Before:	Black Friday site - view of mine
2.	June, 1984	Before:	Black Friday site - view of mine
3.	June, 1984	Before:	Black Friday site - view of mine
4.	June, 1984	Before:	Black Friday site - view of mine
5.	June, 1984	Before:	Black Friday #1 - backfill site
6.	June, 1985	Before:	Black Friday #1 - backfill site
7.	June, 1984	Before:	Black Friday #2 - backfill site
8.	June, 1985	Before:	Black Friday #3 - backfill site
9.	June, 1984	Before:	Black Friday #3 - backfill site
10.	June, 1984	Before:	Black Friday #4 - fencing site
11.	June, 1984	Before:	Black Friday #4 - fencing site
12.	June, 1985	Before:	Black Friday #4 - fencing site
13.	June, 1984	Before:	Black Friday #5 - fencing site
14.	June, 1984	Before:	Black Friday #6 - fencing site
15.	June, 1984	Before:	Black Friday #7 - fencing site
16.	June, 1984	Before:	Black Friday #7 - fencing site
17.	June, 1984	Before:	Black Friday #8 - fencing site
18.	June, 1984	Before:	Black Friday #8 - fencing site
19.	June, 1984	Before:	Black Friday #9 - fencing site
20.	June, 1984	Before:	Black Friday #10 - fencing site
21.	June, 1984	Before:	Black Friday #10 - fencing site
22.	June, 1984	Before:	Black Friday #11 - fencing site
23.	June, 1984	Before:	Black Friday #11 - fencing site
24.	June, 1984	Before:	Black Friday #11 - fencing site
25.	June, 1985	During:	Black Friday #6 & #7 - setting wood panel posts
26.	June, 1985	During:	Black Friday #10 - constructing corner panels with brace rails
27.	June, 1985	During:	Black Friday #11 - stringing wire
28.	Sept., 1985	After:	Black Friday #4 - completed fence
29.	Sept., 1985	After:	Black Friday #5 - completed fence
30.	Sept., 1985	After:	Black Friday #6 - completed fence
31.	Sept., 1985	After:	Black Friday #7 - completed fence
32.	Sept., 1985	After:	Black Friday #8 - completed fence
33.	Sept., 1985	After:	Black Friday #9 - completed fence
34.	Sept., 1985	After:	Black Friday #10 - completed fence
35.	Sept., 1985	After:	Black Friday #11 - completed fence
36.	April, 1986	After:	Black Friday - seeding
37.	June, 1985	Before:	Bluebird shaft #1 - backfill site
38.	June, 1985	Before:	Bluebird shaft #3 - backfill site
39.	April, 1986	After:	Bluebird site - mulched
40.	April, 1986	After:	Bluebird site - mulched
41.	Aug., 1984	Before:	Copper King #1 - fencing site
42.	Aug., 1984	Before:	Copper King #2 - fencing site
43.	Aug., 1984	Before:	Copper King #3 - fencing site
44.	Aug., 1984	Before:	Copper King #4 - fencing site
45.	Aug., 1984	Before:	Copper King #4 - fencing site
46.	Aug., 1984	Before:	Copper King #5 - wood cover site

47.	Aug., 1984	Before:	Copper King #5 - wood cover site
48.	Aug., 1984	Before:	Copper King #5 - wood cover site
49.	June, 1985	During:	Copper King #3 - panel posts set, ready for brace wires
50.	June, 1985	During:	Copper King #4 - drill & blast post holes
51.	Sept., 1985	After:	Copper King - completed fence
52.	Sept., 1985	After:	Copper King #1 & #2 - completed fence
53.	Sept., 1985	After:	Copper King #3 - completed fence
54.	June, 1985	Before:	Cyclone shaft - fencing site
55.	June, 1985	During:	Cyclone shaft - setting fence posts
56.	Sept., 1985	After:	Cyclone shaft - completed fence
57.	Oct., 1984	Before:	Eldorado shaft - backfill site
58.	June, 1985	Before:	Eldorado shaft - backfill site
59.	June, 1985	During:	Eldorado shaft - backfilling
60.	Oct., 1984	Before:	Gold Brick shaft - backfill site
61.	Oct., 1984	Before:	Gold Brick shaft - backfill site
62.	June, 1985	During:	Gold Brick shaft - backfilling
63.	April, 1986	After:	Gold Brick site - mulching
64.	Oct., 1984	Before:	Gold Dust site - view of mine
65.	May, 1985	Before:	Gold Dust shaft #1 - fencing site
66.	Oct., 1984	Before:	Gold Dust shaft #1 - fencing site
67.	June, 1985	During:	Gold Dust shaft #1 - auger post holes
68.	Sept., 1985	After:	Gold Dust shaft #1 - completed fence
69.	Oct., 1984	Before:	Gold Dust shaft #2 - wood cover site
70.	June, 1985	After:	Gold Dust shaft #2 - completed cover
71.	Oct., 1984	Before:	Gold Dust shaft #3 - wood cover site
72.	June, 1985	During:	Gold Dust shaft #3 - completing cover
73.	Sept., 1985	After:	Gold Dust shaft #3 - completed cover
74.	March, 1985	Before:	Gopher site - view of mine
75.	March, 1985	Before:	Gopher site - view of mine
76.	March, 1985	Before:	Gopher shaft #4 - backfill site
77.	March, 1985	Before:	Gopher shaft #4 - backfill site
78.	March, 1985	Before:	Gopher shaft #5 - backfill site
79.	March, 1985	Before:	Gopher shaft #6 - backfill site
80.	March, 1985	Before:	Gopher shaft #7 - backfill site
81.	March, 1985	Before:	Gopher shaft #7 - backfill site
82.	March, 1985	Before:	Gopher shaft #8 - backfill site
83.	March, 1985	Before:	Gopher shaft #8 - backfill site
84.	March, 1985	Before:	Gopher shaft #9 - backfill site
85.	June, 1985	During:	Gopher shaft #6 - backfilling
86.	June, 1985	During:	Gopher shaft #9 - backfilling
87.	June, 1985	During:	Gopher shaft #10 - backfilling
88.	June, 1985	During:	Gopher shaft #10 - backfilling
89.	April, 1986	After:	Gopher site - mulching
90.	Aug., 1984	Before:	Greenhorn shaft #1 - fencing site
91.	June, 1985	During:	Greenhorn shaft #1 - tying brace wire on corner panels
92.	Sept., 1985	After:	Greenhorn shaft #1 - completed fence
93.	Aug., 1984	Before:	Greenhorn shaft #2 - fencing site
94.	Sept., 1985	After:	Greenhorn shaft #2 - completed fence
95.	Oct., 1984	Before:	Iron Age site - view of mine
96.	June, 1985	Before:	Iron Age stope - fencing site

97. Oct., 1984	Before:	Iron Age shaft - fencing site
98. Oct., 1984	Before:	Iron Age stope - fencing site
99. June, 1985	During:	Iron Age site - blasting for fence post holes
100. Sept., 1985	After:	Iron Age site - completed fence
101. Oct., 1984	Before:	Jo Dandy adit #2 - adit door site
102. July, 1985	Before:	Jo Dandy adit #2 - adit door site
103. July, 1985	During:	Jo Dandy adit #2 - installation of adit door
104. July, 1985	After:	Jo Dandy adit #2 - completed door
105. April, 1986	After:	Jo Dandy adit #2 - vandalism to door
106. April, 1986	After:	Jo Dandy adit #2 - vandalism to door
107. Oct., 1984	Before:	Jo Dandy shaft #3 - fence site
108. Oct., 1984	Before:	Jo Dandy shaft #3 - fence site
109. July, 1985	After:	Jo Dandy shaft #3 - completed fence
110. Oct., 1984	Before:	Jo Dandy shaft #4 - fence site
111. Oct., 1984	Before:	Jo Dandy shaft #5 - fence site
112. Oct., 1984	Before:	Jo Dandy shaft #6 - fence site
113. June, 1985	During:	Jo Dandy shafts #4, #5, #6 - level site for fencing
114. July, 1985	During:	Jo Dandy shafts #4, #5, #6 - drill for blasting fence posts
115. July, 1985	During:	Jo Dandy shafts #4, #5, #6 - drive wood fence posts
116. July, 1985	After:	Jo Dandy shafts #4, #5, #6 - completed fence
117. April, 1986	After:	Jo Dandy site - seeding
118. April, 1986	After:	Jo Dandy site - fertilizing
119. April, 1986	After:	Jo Dandy site - mulching
120. Oct., 1984	Before:	Johnny Gulch shaft - fence site
121. June, 1985	During:	Johnny Gulch shaft - set fence posts
122. Sept., 1985	After:	Johnny Gulch shaft - completed fence
123. Oct., 1984	Before:	Keating site - view of mine
124. Oct., 1984	Before:	Keating site - view of mine
125. Oct., 1984	Before:	Keating site - view of mine
126. May, 1985	Before:	Keating shaft #1 - fence site
127. June, 1985	During:	Keating shaft #1 - installing fence panels
128. Sept., 1985	After:	Keating shaft #1 - completed fence
129. Oct., 1984	Before:	Keating shaft #2 - fence site
130. June, 1985	Before:	Keating shaft #2 - fence site
131. Sept., 1985	After:	Keating shaft #2 - completed fence
132. Oct., 1984	Before:	Keating shaft #3 - fence site
133. June, 1985	Before:	Keating shaft #3 - fence site
134. Sept., 1985	After:	Keating shaft #3 - completed fence
135. Oct., 1984	Before:	Keating shaft #4 - fence site
136. June, 1985	Before:	Keating shaft #4 - fence site
137. June, 1985	Before:	Keating shaft #4 - fence site
138. Sept., 1985	After:	Keating shaft #4 - completed fence
139. Oct., 1984	Before:	Keating shaft #5 - fence site
140. May, 1985	Before:	Keating shaft #5 - fence site
141. June, 1985	During:	Keating shaft #5 - blast for post

		holes
142. Sept., 1985	After:	Keating shaft #5 - completed fence
143. Oct., 1984	Before:	Keating shaft #6 - fence site
144. June, 1985	Before:	Keating shaft #6 - fence site
145. Sept., 1985	After:	Keating shaft #6 - completed fence
146. Oct., 1984	Before:	Keating shaft #7 - fence site
147. June, 1985	Before:	Keating shaft #7 - fence site
148. June, 1985	During:	Keating shaft #7 - drilling for posts with auger
149. Sept., 1985	After:	Keating shaft #7 - completed fence
150. Oct., 1984	Before:	Keating shaft #8 - fence site
151. June, 1985	During:	Keating shaft #8 - drill with air compressor
152. Sept., 1985	After:	Keating shaft #8 - completed fence
153. Oct., 1984	Before:	Keating shaft #9 - fence site
154. Oct., 1984	Before:	Keating shaft #9 - fence site
155. June, 1985	Before:	Keating shaft #9 - fence site
156. Oct., 1984	Before:	Keating shaft #9B - fence site
157. June, 1985	During:	Keating shaft #9 - posts at corner panels
158. Sept., 1985	After:	Keating shaft #9 - completed fence
159. Oct., 1984	Before:	Keating shaft #10 - fence site
160. June, 1985	Before:	Keating shaft #10 - fence site
161. June, 1985	During:	Keating shaft #10 - blasting for post holes
162. June, 1985	During:	Keating shaft #10 - auger post holes
163. Sept., 1985	After:	Keating shaft #10 - completed fence
164. Oct., 1984	Before:	Keating shaft #12 - wood cover site
165. Oct., 1984	Before:	Keating shaft #12 - wood cover site
166. June, 1985	Before:	Keating shaft #12 - wood cover site
167. June, 1985	During:	Keating shaft #12 - installing cover
168. Sept., 1985	After:	Keating shaft #12 - completed cover
169. Aug., 1984	Before:	Lucky Friday shaft - fence site
170. June, 1985	Before:	Lucky Friday shaft - fence site
171. June, 1985	After:	Lucky Friday shaft - completed fence
172. Sept., 1985	After:	Lucky Friday shaft - completed fence
173. Oct., 1984	Before:	Mabel shaft - fence site
174. May, 1985	Before:	Mabel shaft - fence site
175. June, 1985	During:	Mabel shaft - drive fence posts
176. Sept., 1985	After:	Mabel shaft - completed fence
177. Oct., 1984	Before:	Nada site - view of mine
178. Oct., 1984	Before:	Nada shaft - wood cover site
179. Oct., 1984	Before:	Nada shaft - wood cover site
180. June, 1985	During:	Nada shaft - constructing wood cover
181. Oct., 1984	Before:	North Home shaft #1 - fence site
182. Oct., 1984	Before:	North Home shaft #1 - fence site
183. Oct., 1984	Before:	North Home shaft #1 - fence site
184. June, 1985	During:	North Home shaft #1 - blast for fence post holes
185. June, 1985	During:	North Home shaft #1 - post setting
186. July, 1985	After:	North Home shaft #1 - completed fence
187. Oct., 1984	Before:	North Home shaft #2 - fence site
188. July, 1985	After:	North Home shaft #2 - completed fence

189. Oct., 1984	Before:	North Home shaft #3 - wood cover site
190. June, 1985	After:	North Home shaft #3 - completed cover
191. Oct., 1984	Before:	Ohio shaft - wood cover site
192. Oct., 1984	Before:	Ohio shaft - wood cover site
193. Oct., 1984	Before:	Ohio shaft - wood cover site
194. Oct., 1984	Before:	Ohio shaft - wood cover site
195. May, 1985	Deleted:	Ohio mine fire - destroyed headframe
196. May, 1985	Deleted:	Ohio mine fire - destroyed headframe
197. May, 1985	Deleted:	Ohio mine fire - destroyed headframe
198. May, 1985	Deleted:	Ohio mine fire - destroyed headframe
199. June, 1985	Deleted:	Ohio mine fire - destroyed headframe
200. June, 1985	Before:	Powerline shaft - backfill site
201. July, 1984	Before:	Rena shaft - backfill site
202. July, 1984	Before:	Rena shaft - backfill site
203. May, 1985	Before:	Rena shaft - backfill site
204. June, 1985	During:	Rena shaft - backfilling
205. April, 1986	After:	Rena shaft - seeding
206. April, 1986	After:	Rena shaft - mulched
207. Oct., 1984	Before:	Ruby shaft - wood cover site
208. Oct., 1984	Before:	Ruby shaft - wood cover site
209. Oct., 1984	Before:	Ruby shaft - wood cover site
210. Oct., 1984	Before:	Ruby shaft - wood cover site
211. June, 1985	During:	Ruby shaft - constructing wood cover
212. Oct., 1984	Before:	Summit site - view of mine
213. Oct., 1984	Before:	Summit shaft #1 - fence site
214. July, 1985	During:	Summit shaft #1 - drill and blast for fence posts
215. July, 1985	After:	Summit shaft #1 - completed fence
216. Oct., 1984	Before:	Summit shaft #2 - fence site
217. July, 1985	During:	Summit shaft #2 - set wood fence posts
218. July, 1985	After:	Summit shaft #2 - completed fence
219. Oct., 1984	Before:	Summit shaft #3 - wood cover site
220. Oct., 1984	Before:	Summit shaft #3 - wood cover site
221. June, 1985	During:	Summit shaft #3 - constructing cover
222. Oct., 1984	Before:	Summit adit #4 - adit door site
223. July, 1985	During:	Summit adit #4 - installing door
224. July, 1985	After:	Summit adit #4 - completed door
225. Oct., 1984	Before:	Summit adit #5 - adit door site
226. July, 1985	During:	Summit adit #5 - installing door
227. Aug., 1984	Before:	Surprise shaft - backfill site
228. Aug., 1984	Before:	Surprise shaft - backfill site
229. June, 1985	During:	Surprise shaft - backfilling
230. Oct., 1984	Before:	Tidal Wave shaft - fence site
231. June, 1985	Before:	Tidal Wave shaft - fence site
232. June, 1985	During:	Tidal Wave shaft - level site before fencing
233. Sept., 1985	After:	Tidal Wave shaft - completed fence
234. April, 1986	Before:	Vermont Quarry shaft - backfill site
235. July, 1984	Before:	Vermont Quarry shaft - backfill site
236. April, 1986	Before:	Vermont Quarry shaft - backfill site
237. April, 1986	Before:	Vermont Quarry shaft - backfill site
238. April, 1986	During:	Vermont Quarry shaft - construction equipment

239.	April, 1986	During:	Vermont Quarry shaft - backfilling
240.	April, 1986	During:	Vermont Quarry shaft - backfilling
241.	April, 1986	During:	Vermont Quarry shaft - backfilling
242.	April, 1986	During:	Vermont Quarry shaft - backfilling
243.	April, 1986	During:	Vermont Quarry shaft - backfilling
244.	April, 1986	During:	Vermont Quarry shaft - backfilling
245.	April, 1986	During:	Vermont Quarry shaft - backfilling
246.	April, 1986	During:	Vermont Quarry shaft - backfilling
247.	April, 1986	During:	Vermont Quarry shaft - backfilling
248.	April, 1986	After:	Vermont Quarry shaft - completed backfill
249.	April, 1986	After:	Vermont Quarry shaft - completed backfill
250.	April, 1986	After:	Vermont Quarry shaft - completed backfill
251.	April, 1986	After:	Vermont Quarry shaft - completed backfill
252.	April, 1986	After:	Vermont Quarry shaft - seeding
253.	April, 1986	After:	Vermont Quarry shaft - mulching

